

CLAIMS:

1. A multi-component system for making impressions which contains

- (a) at least one compound having at least two alkenyl groups;
- (b) at least one organohydrogenpolysiloxane;
- (c) at least one hydrosilylation catalyst;

characterized by containing

- (d1) at least one polymeric compound having at least one alkynyl group and/or
- (d2) at least one compound having at least one Si-OR structural unit, wherein R = H, alkyl, alkoxyalkyl or acyl; and

when a compound (d2) having at least one Si-OR structural unit is contained,

- (e) at least one condensation catalyst and/or condensation cross-linking agent.

2. A multi-component system for making impressions according to claim 1 comprising at least two components A and B, characterized in that component A contains

- (a) at least one compound having at least two alkenyl groups; and
- (b) at least one organohydrogenpolysiloxane; and
- (d1) at least one polymeric compound having at least one alkynyl group and/or

- (d2) at least one compound having at least one Si-OR structural unit, wherein  
R = H, alkyl, alkoxyalkyl or acyl;

and component B contains

- (c) at least one hydrosilylation catalyst; and

when a compound (d2) having at least one Si-OR structural unit is contained,  
component A and/or B contains

- (e) at least one condensation catalyst and/or condensation cross-linking  
agent.

3. A multi-component system for making impressions according to claim 1  
comprising at least two components A and B, characterized in that component A  
contains

- (a) at least one compound having at least two alkenyl groups; and

- (b) at least one organohydrogenpolysiloxane; and

component B contains

- (c) at least one hydrosilylation catalyst; and

- (d2) at least one compound having at least one Si-OR structural unit, wherein  
R = H, alkyl, alkoxyalkyl or acyl;

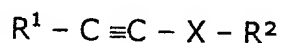
and either component A or B contains

- (e) at least one condensation catalyst and/or condensation cross-linking  
agent.

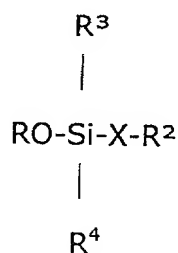
4. A multi-component system for making impressions according to claim 2,  
characterized in that component A and/or B contains

- (f) inhibitors of the condensation reactions of condensation catalysts and/or condensation cross-linking agents with compounds containing Si-OR structural units, wherein R = H, alkyl, alkoxyalkyl or acyl;
- (g) water-donating agents;
- (h) desiccants;
- (i) inert carrier materials;
- (j) compounds for reaction inhibition of the hydrosilylation reaction;
- (k) reinforcing fillers;
- (l) non-reinforcing fillers; and/or
- (m) auxiliaries.

5. A multi-component system for making impressions according to claim 1, characterized in that the alkynyl compound (d1) is



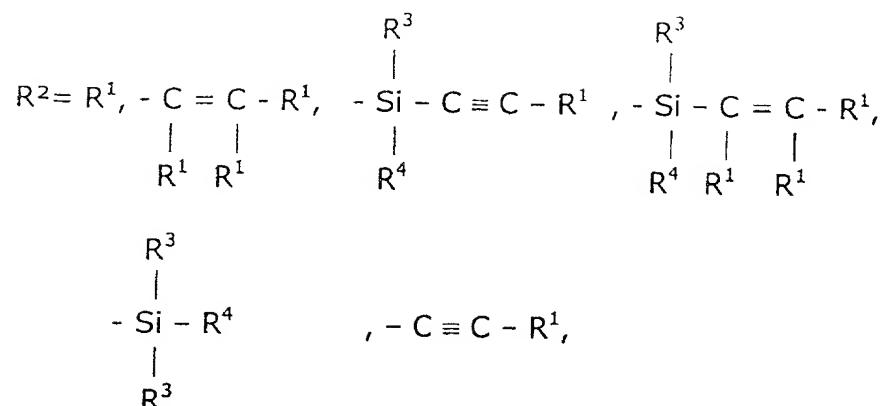
and the Si-OR compound (d2) is



wherein

R = H, alkyl, alkoxyalkyl or acyl;

R<sup>1</sup> = alkyl, aryl, arylalkyl, halogen-substituted alkyl and aryl groups, cyanoalkyl, cycloalkyl, cycloalkenyl, especially -H, -OH, alkoxy, acyl and combinations thereof;

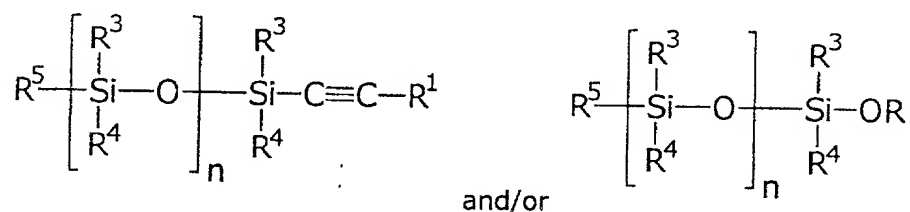


$R^3$  = alkenyl, alkynyl, halogen, aryl, alkylaryl, H, halogen-substituted alkyl and aryl groups, especially alkyl, alkoxy and hydroxy, and combinations thereof;

$R^4$  =  $R^3$ , or  $R^4$  is different from  $R^3$ , wherein  $R^4$  is, in particular, alkoxy, hydroxy, alkyl, methyl, alkynyl, ethynyl, or combinations thereof; and

X = polysiloxane, oligosilicic acid esters, polysilicic acid esters, polyethers, polymeric hydrocarbons, polyesters and copolymers of the above mentioned compounds.

6. A multi-component system for making impressions according to claim 1, characterized in that compound (d1) or (d2) is

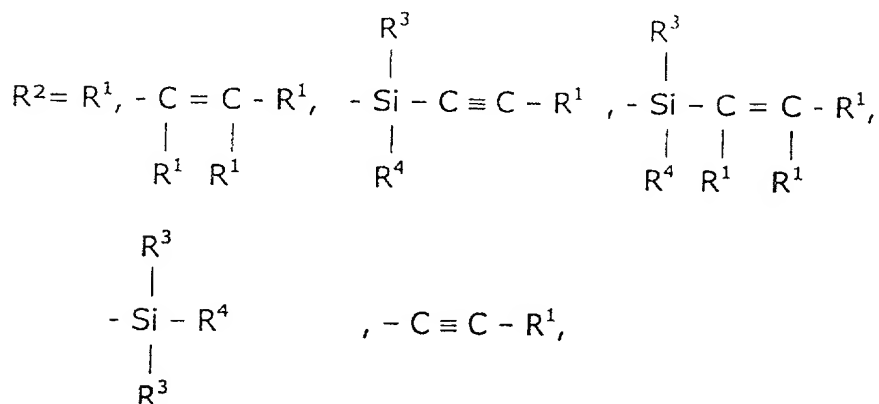


wherein  $n$  = 7 to 6000, preferably 20 to 6000, more preferably 100 to 6000;

wherein

R = H, alkyl, alkoxyalkyl or acyl;

R<sup>1</sup> = alkyl, aryl, arylalkyl, halogen-substituted alkyl and aryl groups, cyanoalkyl, cycloalkyl, cycloalkenyl, especially -H, -OH, alkoxy, acyl and combinations thereof;

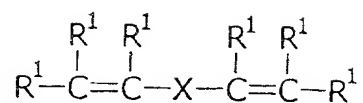


R<sup>3</sup> = alkenyl, alkynyl, halogen, aryl, alkylaryl, H, halogen-substituted alkyl and aryl groups, especially alkyl, alkoxy and hydroxy, and combinations thereof;

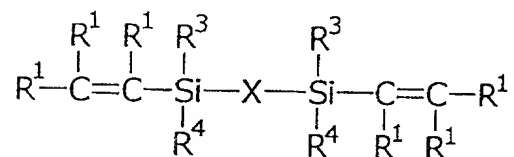
R<sup>4</sup> = R<sup>3</sup>, or R<sup>4</sup> is different from R<sup>3</sup>, wherein R<sup>4</sup> is, in particular, alkoxy, hydroxy, alkyl, methyl, alkynyl, ethynyl, or combinations thereof; and

R<sup>5</sup> =  $-C \begin{array}{c} R^1 R^1 \\ | \quad | \end{array} \equiv C - R^1$ , H, alkyl, aryl, alkylaryl, halogen, OH, halogen-substituted alkyl and aryl groups, -OR, aminoalkyl, epoxy, cyanoalkyl, cycloalkyl, alkylhydroxyl, methacrylate, acrylate, mercaptoalkyl, carboxylate, carboxyalkyl or succinic anhydride.

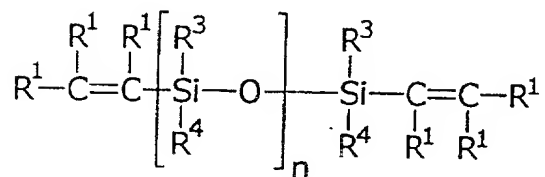
7. A multi-component system for making impressions according to claim 1, characterized in that the alkenyl compound (a) is



and/or



and/or

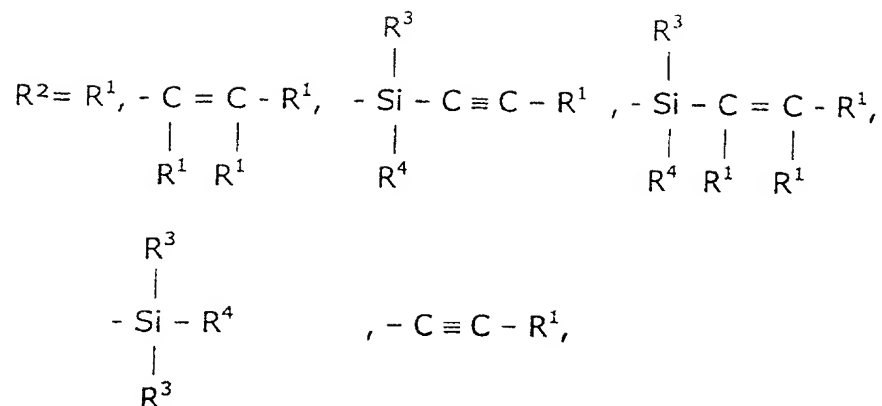


wherein n = 0 to 6000; and/or

a silane dendrimer having terminal alkenyl groups;

wherein

R<sup>1</sup> = alkyl, aryl, arylalkyl, halogen-substituted alkyl and aryl groups, cyanoalkyl, cycloalkyl, cycloalkenyl, especially -H, -OH, alkoxy, acyl and combinations thereof;



$R^3$  = alkenyl, alkynyl, halogen, aryl, alkylaryl, H, halogen-substituted alkyl and aryl groups, especially alkyl, alkoxy and hydroxy, and combinations thereof;

$R^4$  =  $R^3$ , or  $R^4$  is different from  $R^3$ , wherein  $R^4$  is, in particular, alkoxy, hydroxy, alkyl, methyl, alkynyl, ethynyl, or combinations thereof; and

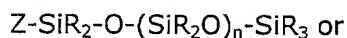
X = polysiloxane, oligosilicic acid esters, polysilicic acid esters, polyethers, polymeric hydrocarbons, polyesters and copolymers of the above mentioned compounds.

8. A multi-component system for making impressions according to claim 1, characterized in that the organohydrogenpolysiloxanes (b) are polyalkyl-, polyaryl- and polyalkylaryl-, polyhaloalkyl-, polyhaloaryl- or polyhaloalkylarylsiloxanes, which are present in the form of oligomers or polymers in a linear, branched or cyclic form or as a QM resin and have at least one Si-H bond.

9. A multi-component system for making impressions according to claim 1, characterized in that the condensation catalysts and/or condensation cross-linking agents (e) are aluminum alkoxides, antimony alkoxides, barium alkoxides, boron alkoxides, calcium alkoxides, cerium alkoxides, erbium alkoxides, silicon alkoxides, gallium alkoxides, germanium alkoxides, hafnium alkoxides, indium alkoxides, iron alkoxides, lanthanum alkoxides, magnesium alkoxides, neodymium alkoxides, samarium alkoxides, strontium alkoxides,

tantalum alkoxides, titanium alkoxides, tin alkoxides, vanadium alkoxide oxides, yttrium alkoxides, zinc alkoxides, zirconium alkoxides, titanium or zirconium compounds, especially titanium, zirconium and hafnium alkoxides, and double metal alkoxides, chelates and oligo- and polycondensates of the above alkoxides, dialkyltin diacetate, tin(II) octoate, dialkyltin diacylate or dialkyltin oxide.

10. A multi-component system for making impressions according to claim 1, characterized in that the hydrosilylation catalysts (c) are transition metals of the 8th auxiliary group, preferably platinum, palladium and rhodium or their salts, complexes and colloids, preferably platinum complexes and salts of hexachloroplatinic acid.
11. A multi-component system for making impressions according to claim 4, characterized in that the inhibitors of the condensation reactions (f) are di-, tri-, oligo- and -polydialkylsiloxanes of general formula



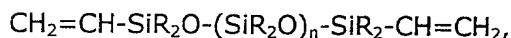
wherein Z is OH or  $NR_2$ , R represents the same or different optionally substituted hydrocarbyl residues, such as alkyl, alkenyl, aryl or alkynyl, and n = 0 or an integer of from 1 to 100; or

aliphatic diols, diamines, diphosphanes, polyamines, polyphosphanes or polyols, OH-, NH- or PR-functional polyethers or other chelating compounds.

12. A multi-component system for making impressions according to claim 4, characterized in that the water-donating agents (g) are inorganic fillers containing superficially bound residual moisture or water bound in the crystal lattice, zeolites, purposefully moistened fillers or organic substances having a defined water content.



13. A multi-component system for making impressions according to claim 4, characterized in that the desiccants (h) are zeolites, dried fillers or water-absorbing organic compounds, such as oxazolidines and alkali salts of poly(meth)acrylic acid (superabsorbers).
14. A multi-component system for making impressions according to any of claims 4 to 13, characterized in that the inert carrier materials (i) are mineral oils, branched hydrocarbons, vaseline, esters, phthalic acid esters, acetyltributyl citrate, polyalkylene oxides and polyesters and their copolymers.
15. A multi-component system for making impressions according to claim 4, characterized in that the compounds for reaction inhibition of the hydrosilylation reaction (j) are short-chained organopolysiloxanes of general formula



wherein R represents the same or different optionally substituted hydrocarbyl residues, such as alkyl, alkenyl, aryl, alkynyl, alkenyl, and alkynyl-terminated siloxane residues; and

$n = 0$  or an integer of from 1 to 6; or

vinyl-containing cyclic siloxanes, such as tetravinyltetramethylcyclotetrasiloxane, or organic hydroxy compounds containing terminal double or triple bonds, diethyl maleate, alkylsilane, arylsilane, alkenylsilane, alkynylsilane, benzotriazole, compounds comprising a 1,4-ene-yne structural unit, compounds comprising a 1,3-ene-yne structural unit, such as 2-methyl-1-hexene-3-yne, ethyl-3-(trimethylsilyl)propynoate, bis(phenylethynyl)dimethylsilane, diynes, such as decadiyne or dodecadiyne, polyynes, dienes, polyenes, such as decatriene, (1,3-dioxane-2-ylethynyl)trialkylsilane, 1,4-divinyltetramethyldisilylethane, amines or phosphanes.

16. A multi-component system for making impressions according to claim 4, characterized in that the reinforcing fillers (k) are highly dispersed active fillers, such as titanium dioxide, aluminum oxide, zinc oxide, preferably wet-precipitated or pyrogenic silicic acid, which may optionally be in a hydrophilic or hydrophobized form; or mineral fibrous fillers, such as wollastonite; or synthetic fibrous fillers, such as glass fibers, ceramic fibers or plastic fibers.
17. A multi-component system for making impressions according to claim 4, characterized in that the non-reinforcing fillers (l) are metal oxides, metal oxide hydroxides, mixed oxides or mixed hydroxides, preferably silica, especially in the form of quartz and its crystalline modifications, fused silica, alumina, calcium oxide, aluminum hydroxide, calcium carbonate, kieselguhr, diatomaceous earth, talcum, ground glasses and plastic-based fillers, for example, polymethyl methacrylate, polycarbonate, polyvinyl chloride, silicone resin powder, or powder based on fluoro-organic compounds, the non-reinforcing fillers optionally being surface-treated (coated).
18. A multi-component system for making impressions according to claim 4, characterized in that the auxiliaries (m) are dyes, surfactants, opaque substances, matting agents, such as titanium dioxide or zinc oxide, plasticizers, hydrogen adsorbers/absorbers, radiopaque substances or organosilicon MQ resins comprising Si-vinyl, Si-OR, Si-ethynyl and/or SiH groups, or compounds or buffers and substances for adjusting the pH range.
19. Mixtures obtainable by mixing the components A and B of claim 2.
20. The mixtures according to claim 19, characterized in that, during and after the mixing of the components, the mixture, in a first step, undergoes a transition from a lighter-bodied mixer-suitable initial consistency to a heavier-bodied plastic phase in which the material builds up a high force pressure in the making of dental impressions in the impression tray, and in a second step, cures to its final elastic form.

21. The mixtures according to claim 19, characterized in that said mixtures have been cured to completion.
22. The mixtures according to claim 19, characterized in that the mixtures have a mixer-suitable consistency, in a first state at the beginning of mixing, of  $> 26$  mm, preferably  $> 30$  mm (according to ISO 4823), whereupon the mixtures undergo transition to a heavier-bodied second state with a consistency of  $< 35$  mm, preferably  $< 30$  mm (according to ISO 4823), caused by condensation reactions of SiOR groups and/or by hydrosilylation reactions of alkynyl groups with SiH groups, this latter consistency being maintained over a period of at least 15 s, and thereafter, the mixtures undergo transition to a third solid, elastic state following curing through a hydrosilylation reaction of alkenyl groups with SiH groups.
23. A method for the preparation of impressions from objects from which impressions are to be made using a multicomponent system according to claim 1, wherein the impression material is prepared by mixing the components, wherein the impression material is first dispensable in a first state from a container, whereupon it undergoes transition to a second state in which the viscosity of the impression material is increased, whereupon an impression is prepared from an object from which an impression is to be made, whereupon the impression material undergoes transition to a third, solid state in which an impression result is recorded, the second state being achieved by graded hydrosilylation reactions between alkynyl and alkenyl structural units with compounds containing Si-H groups and/or by graded addition reactions (between alkenyl and SiH groups) and condensation reactions (of SiOR groups with condensation catalysts).
24. The method according to claim 23, characterized in that the consistency of the impression material in a first state at the beginning of mixing is  $> 26$  mm, preferably  $> 30$  mm (according to ISO 4823), and the impression material is mixer-suitable in this first state, that the consistency of the impression material in the second state is  $< 35$  mm, preferably  $< 30$  mm (according to ISO 4823), wherein the impression material is heavier-bodied than it is in the first state,

and that the impression material in this second state is retained to the end of the total pot life, i.e., for at least 15 s.

25. The method according to claim 19, characterized in that the mixtures have a mixer-suitable consistency, in a first state at the beginning of mixing, of > 26 mm, preferably > 30 mm (according to ISO 4823), whereupon the mixtures undergo transition to a heavier-bodied second state with a consistency of < 35 mm, preferably < 30 mm (according to ISO 4823), by a hydrosilylation reaction of alkenyl groups with SiH groups, this latter consistency being maintained over a period of at least 15 s, and thereafter, the mixtures undergo transition to a third solid, elastic state through condensation reactions of SiOR groups and/or through hydrosilylation reactions of alkynyl groups with SiH groups.